UCRL-JC-125700 ABS

DETECTION OF CHROMOSOME DAMAGE IN INTER-PHASE NUCLEI IN RAT TISSUES BY MULTI-COLOR FISH USING REGION-SPECIFIC DNA PROBES.

K. Matsumoto* and J.D. Tucker. BBRP, PO Box 808, L-452, Lawrence Livermore National Laboratory, Livermore, CA.

Interphase cytogenetic analysis using fluorescence *in situ* hybridization (FISH) enables us to detect chromosome aberrations in tissues where few metaphase cells are available. To develop a new approach for detection of chromosome damage in rat interphase nuclei, we generated region-specific DNA probes for rat chromosome 1q11-12, 1q31-35 and 1q51-53 by microdissection. Multi-color FISH using these probes revealed that the fluorescent signals with three colors in normal interphase nuclei were typically arranged in the same order as seen in metaphase. To evaluate the ability of these probes to identify chromosome aberrations in interphase, rats were exposed whole-body to 0, 1, 2, 3 or 4 Gy of ^{137}Cs gamma rays. Eight days later peripheral blood, bone marrow, lung and pancreas were removed and single cell preparations were placed onto slides. FISH analysis showed that numerical changes were readily identified in each tissue. The frequencies of interphase nuclei with disordered signals were increased in both peripheral blood and bone marrow in a dose responsive manner. In lung and pancreas, on the other hand, no increases in the frequencies of abnormal interphase nuclei were found at any dose of radiation. The reason for this lack of detection may be that chromosome domains have not moved inside the nucleus after irradiation because almost all these cells stay in G_0 phase in adult animals. We are currently examining whether such "hidden" chromosome damage is revealed after short term primary culture. This work was performed under the auspices of the US DOE by LLNL under contract No. W-7405-ENG-48 with support from NIH grant PO1CA-55861.